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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,874	03/05/2002	Yoshiki Hishiro	MI22-1873	9983

21567 7590 06/06/2003

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EXAMINER

PERALTA, GINETTE

ART UNIT PAPER NUMBER

2814

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/092,874

Applicant(s)

HISHIRO, YOSHIKI

Examiner

Ginette Peralta

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 01 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 19-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s): _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 19-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara et al. (U. S. Pat. 6,403,280 B1) in view of Cheng et al. (US Pat. Pub. 2003/0008246 A1).

Yamahara et al. discloses in col. 3, ll. 60-67, col. 4, ll. 1-12, and col. 30, l. 44-col. 31, l. 60, a method of forming a semiconductor construction that comprises providing a semiconductor substrate, forming a first layer comprising silicon and nitrogen over the substrate (col. 31, l. 35), and forming a bilayer of a photoresist system over and physically against the first layer.

Yamahara et al. discloses the claimed invention with the exception of forming a second layer comprising at least 50 weight % carbon over and physically against the first layer.

Cheng et al. discloses a method of forming a semiconductor construction that comprises providing a semiconductor substrate, the substrate may comprise a silicon oxynitride substrate; forming an organic anti-reflective coating layer; wherein Cheng et

al. further teaches that the substrate may be a bilayer substrate comprising a substrate material and an underlayer that may comprise one of polyester, polyacrylates, and fluorinated polymers, among others, and forming a layer consisting essentially of a photoresist system over and physically against the organic underlayer, wherein the organic underlayer is taught for the disclosed intended purpose of using a material that is highly absorbing at the imaging wavelength and compatible with the imaging layer, while protecting the underlying substrate from the acid generated during the development of the photoresist.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an underlayer that is highly absorbing at the imaging wavelength and compatible with the imaging layer over the semiconductor substrate for the disclosed intended purpose of enhancing the development of the photoresist layer while protecting the underlying substrate from the acid generated during the development of the photoresist.

Yamahara et al. further teaches exposing the photoresist system to patterned light and subsequently heating the photoresist system (col. 31, ll. 40-46), the photoresist system releasing acid into the system. Cheng et al. discloses that the second layer comprises a polyacrylate or a polyhydroxystyrene, which are compounds that depending on the composition may release acid during the heating. Wherein the release of the acid by the underlayer is a desirable feature as Cheng et al. and Yamahara et al. disclose that the photogenerated acid catalyzes the deblocking process, in which the

blocked insoluble polymer of the resist is converted to a soluble polymer with a hydroxyl group and a volatile component, and the volatile group then generates a transient free volume that augments diffusion and if this process were to stop it would result in an unwanted alteration of the shape of the developed photoresist.

Yamahara et al. discloses that the first layer comprises a silicon oxynitride layer having silicon, oxygen, and nitrogen.

Yamahara et al. as modified by Cheng et al., discloses that forming the second layer comprises spin-coating the second layer across the underlying substrate.

Yamahara et al. discloses that the photoresist bilayer has an underlayer that comprises a surfactant for improving applicability and developability, thus it would have been obvious to one of ordinary skill in the art at the time the invention was made for the second organic layer to comprise a surfactant in order to improve the applicability like Yamahara et al. discloses.

Yamahara et al. as modified by Cheng et al. discloses that the second layer comprises a cross-linked polymer or an acrylic polymer (Cheng et al. [0076]).

Yamahara et al. as modified by Cheng et al. does not disclose the wavelength that is absorbed by the second layer, but various materials are taught that can be used as the second layer, which can be chosen depending on the desired characteristic of wavelength absorbed by the material among other properties. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a material that absorbs a wavelength equal to the one applied to the photoresist,

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since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (703)305-7722. The examiner can normally be reached on Monday to Friday 8:00 AM- 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

GP
June 2, 2003

ST